



# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### Improvements in Method of Treating Wounds

I, JAMES DONALD MACLACHLIN, a subject of the King of Great Britain, of 15, Summit Street, East Orange, State of New Jersey, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed; to be particularly described and ascertained in and by the following statement:—

My invention relates to methods and apparatus for treating wounds and has for its principal object to do away with the bandaging and dressing of wounds as is now found necessary to prevent infections.

It is well known that wounds heal more rapidly if uncovered, but as the streptococcus, staphylococcus and other micro-organisms which produce infection are present everywhere in inhabited localities it is necessary to keep wounds covered with sterile bandages and dressings and change the dressings at frequent intervals in order to prevent infection. Removing and replacing the dressings, however skillfully carried out is not only painful, but irritates the wound and prolongs the period of healing.

By my improved method of healing I cover the wound with a transparent convex shield large enough at its base, in proportion to the size of the wound, to completely surround the wound and contact only the unbroken skin beyond the area of inflammation. The shields are preferably made of a flexible material and at the base each is provided with a gasket of soft rubber or the like to conform with the contour of the body at the point of application. The shield does not make an air-tight seal against the skin but the ingress of air to the interior of the shield is prevented by continually delivering to the space within the shield a stream of sterile air or other gas under pressure to thereby maintain the pressure under the shield slightly above the pres-

sure of the surrounding air with a constant stream of outgoing sterile air between the gasket and the skin. With this arrangement it is impossible for contaminated air to enter under the shield and the wound is maintained sterile without having any bandages or dressings contacting the open wound or the surrounding inflamed area. The wound can be observed through the transparent shield and in the preferred embodiment of the apparatus shown in the accompanying drawings, means are provided for applying medication to the wound, and also for washing the wound, all without removing the shield.

Referring to the drawings,

Figure 1 is a perspective view showing the apparatus as applied to the treatment of a wound;

Figure 2 is a sectional view on an enlarged scale on line 2-2 of Figure 1;

Figure 3 is a perspective view on an enlarged scale of the shield forming part of the apparatus; and

Figure 4 is a sectional view showing a modified form of the shield.

Referring to the drawings, 1 represents the shield to be placed over the wound, which is preferably made of fairly flexible, transparent material such as celloid, lucite or the like. The shield may be made in various shapes to fit the parts of the human body, but for general application, where a special contour is not required, the shape shown, namely, that of a segment of a hollow sphere, is satisfactory. The shield is provided around its base with a flange 2 which is normally flat and has attached to its under face a gasket 3 of soft rubber adapted to readily conform to the surface against which the shield is to be held. For holding the shield in place, any suitable fastening means may be employed, for example, straps 4 are attached to the flange 2 at opposite sides of the shield and are satisfactory. The straps may

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be made in varied length, permitting the shield to be readily strapped around different parts of the body. The shield is preferably provided with three integral molded connections to receive rubber tubes. Of these, connections 5 and 6 are inlet connections and connection 7 is a discharge connection. The latter, as will be observed from Figure 4, extends horizontally out from the shield close to the flange 2 to better drain the space under the shield of the liquid used in washing or medicating the wound.

One of the connections 5 and 6, here shown as connection 6, is connected by a rubber hose to a closed jar 9, which will be supported in a convenient manner near the body of the patient being treated. The connection to the jar 9 for the hose leading to the shield is near the bottom of the jar beneath a filter 10 onto which there is continuously discharged, in any suitable manner, a suitable germicidal agent in solution in a volatile solvent. As shown, the germicidal solution is contained in a vessel 11 supported in the jar 9 upon integral lugs projecting inwardly from the walls of the jar. The vessel 11 is provided with a drip discharge which continuously drips the germicidal solution onto the filter at a rate such that the air under pressure which is continuously delivered to the jar 9 through an inlet 14 near the top of the jar will be completely sterilized.

It will be understood that the jar 9 is normally closed by a lid 8 held clamped in place in the usual manner under pressure sufficient to hold the jar closed against the pressure in the jar, which will be a pound or two above atmospheric pressure. Connected to the inlet 5 by a suitable hose is a jar 13 which will be supported in any suitable manner near and above the body of the patient to receive any liquid that it is desired to apply to the wound. The jars 9 and 13 are provided with stop cocks and in addition the hose or tubes attached to the inlet and outlet connections of the shield are equipped with clamps to facilitate shutting off and opening the various tubes, as may be necessary in the course of treatment of the wound.

In using the apparatus, as soon as the wound is initially dressed, and without the application of any bandages or other dressing, it is covered by means of the shield 1 in the manner illustrated, which is held in place by the strap 4. Immediately the shield is in place the stop cocks on the connections leading from the pressure pump and the clamp on the tubing leading to the shield are

opened and air or other gas under pressure is forced into the jar 9, thence through the filter 10, and through the hose connection to the shield. In passing through the filter the air from the jar 9 is treated with the sterilizing agent; the solvent of which may also contain a medicinal agent, and this not only sterilizes the air passing through the filter, but also aid in the treatment of wounds. The air thus continuously discharged into the space beneath the shield finds its way out of the shield in the form of an outgoing stream of air coextensive with the circumference of the shield. Air under pressure is continuously discharged into the jar while the treatment is in progress, thereby maintaining the space under the shield charged with sterilized air under pressure, thereby making it impossible for any contaminated air to leak into the space under the shield from the surrounding atmosphere.

Normally the drain connection and the connection leading to the jar 13 are cut off and the wound permitted to heal without treatment other than medication which may be added to the volatile liquid in the container enclosed within the jar 9.

If, however, it is desired to irrigate the wound or treat it with some medication other than that supplied from the jar 9, the hose from the jar 9 may be shut off and the hose from the jar 13 opened to deliver the desired liquid to the shield. The surplus liquid can be drained off through the discharge 7, which can be opened and closed as desired.

It will of course be understood that the arrangement for maintaining a constant supply of sterile air under pressure through the shield 1 may be variously modified to meet various hospital conditions. For example, in a large casualty hospital a common duct for sterile air under pressure may serve an entire ward.

In Figure 4 I have shown a modified form of shield wherein there is formed on the under side of the transparent convex portion of the shield a convex protuberance indicated at 17, forming with the convex surface on the outside of the shield a magnifying lens whereby the condition of the wound may be fully determined without removing the shield.

It will be understood that the essential feature of my novel method and apparatus for treating wounds is the provision of a covering in the form of a shield which does not contact the wound, and the maintenance under the shield of a continuously replenishing atmo-

sphere of sterile air or other gas at a pressure above the surrounding atmospheric pressure. The medication of the wound is desirable, but not necessary.

- 5 Wounds which are covered in the manner described and are treated merely with air or other gas which might be merely sterilized, for example, by heat or ultra-violet rays, will heal more quickly than wounds bandaged or dressed in the normal manner.

10 It will be further understood that various changes other than those described may be made in the apparatus illustrated without departing from the spirit of my invention.

15 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:—

1. The method of treating wounds which consists in covering the wound with a shield shaped to provide a cavity under the shield and overlying the wound and maintaining the cavity charged with sterile gas under pressure sufficiently greater than atmospheric pressure to prevent the ingress of contaminated air.

2. The method of treating wounds which consists in covering the wound with a shield shaped to provide a cavity under the shield and overlying the wound, and maintaining the cavity charged with medicated and sterile gas under pressure to prevent the ingress of contaminated air.

3. An apparatus for treating wounds comprising a hollow convex shield of flexible material, means for attaching said shield to the patient with the margin

at the base thereof in contact with the flesh of the patient completely surrounding the wound, and means for continuously delivering to the space beneath the shield overlying the wound sterile gas under pressure above the surrounding atmospheric pressure.

4. An apparatus as claimed in claim 3 including means for medicating the gas in its passage to the shield.

5. Apparatus for treating wounds as claimed in claims 3 or 4 including a hose connection formed on the shield opening into the space within said convex portion.

6. Apparatus for treating wounds as claimed in claims 3, 4 or 5 including straps attached to the shield for attaching the same to the body of the patient in position overlying the wound.

7. Apparatus for treating wounds as claimed in claims 3 or 4 including a plurality of hose connections formed on said shield opening into the space within the convex portion, means for supplying sterile gas under pressure through one of said connections, and means for supplying a liquid for irrigation or medication through another of said connections.

8. In an apparatus for treating wounds as claimed in the preceding claims the feature that the wall of the convex portion has a part of lens shape to thereby magnify the surface beneath the shield to the eye of an observer.

Dated this 30th day of August, 1948.  
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[This Drawing is a reproduction of the Original on a reduced scale.]

